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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/582,025	06/08/2006	David Virette	P1921US	1368

8968 7590 02/27/2009
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EXAMINER	
BORSETTI, GREG	
ART UNIT	PAPER NUMBER
2626	

MAIL DATE	DELIVERY MODE
02/27/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/582,025	Applicant(s) VIRETTE ET AL.	
	Examiner GREG A. BORSETTI	Art Unit 2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 January 2009*.

2a)☐ This action is FINAL. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-27 are pending.

2. Claims 1, 24, 25 have been amended.

3. Claim 27 has been added.

Continued Examination Under 37 CFR 1.114

4. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/12/2009 has been entered.

Response to Arguments

5. Applicant's arguments with respect to claims 1-27 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

6. Claim 1, 24-25, 27 are objected to because of the following informalities: The “feeding” limitation of claim 1 is written in somewhat obscure English (see “succession of functional units ***with a view to compression coding*** of said signal”). The examiner suggests “succession of functional units for compression coding of said signal.”

7. Claim 1, 24-25, 27 are objected to because of the following informalities: The "feeding" step should be marked with a corresponding letter similar to the following steps, or the following steps should remove the letter markings such that all claim limitations are either marked or not.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1, 24-25, 27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Step c) has been amended to state that the common functions are executed "only one time for the input signal…" This is not true because the input signal has been segmented into frames. Therefore, the examiner contends and interprets that the common functions are not executed only one time for the input signal, but once per frame.

Appropriate correction or clarification is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1, 2, 12, and 27 are rejected under 35 U.S.C. 103(a) as being taught by Gao et al. (US Patent #6581032).

As per claim 1, Gao teaches the multiple compression coding method comprising:

feeding an input signal in parallel to an apparatus comprising a plurality of coders, each including a succession of functional units with a view to compression coding of said signal by each coder, where each coder comprises a different combination of functional units (Gao, Fig. 2, columns 9-10, lines 64-67, 1-13, *…it should be noted that the initial frame-processing module 44 performs processing that is common to all the rate encoders 36, 38, 40, and 42 and particular processing that is particular to each rate encoder 36, 38, 40, and 42…*)

a) identifying the functional units forming each coder and one or more functions implemented by each unit (Gao does not explicitly teach the identification of functional units forming each coder. However, Gao, columns 9-10, lines 64-67, 1-13, *…it should be noted that the initial frame-processing module 44 performs processing that is common to all the rate encoders 36, 38, 40, and 42 and particular processing that is particular to each rate encoder 36, 38, 40, and 42…*, teaches that common processing is performed prior to the rate encoder and therefore the common functions would have inherently had to have been identified.)

b) marking functions that are common from one coder to another;

(Gao does not explicitly teach the marking of common functions, however columns 9-10, lines 64-67, 1-13, teach that common processing is done, therefore it would have been obvious to someone of ordinary skill in the art that the functions common to the coders would have been marked to later be able to compile their functions in the initial frame-processing module.)

c) executing said common functions only one time for the input signal for at least some of the coders in a common calculation module (Gao, column 10, lines 15-23, …*The encoding by the initial frame-processing module 44 quantizes parameters of the speech signal 18 contained in a frame. The quantized parameters result in generation of a portion of the bitstream*…, The quantization occurs once per frame for the input signal.)

d) producing and feeding a coded output signal from the apparatus based at least in part on the common functions. (Gao, Fig. 2, the encoder produces a coded output signal based on the initial frame-processing.)

As per claim 2, claim 1 is incorporated and Gao teaches:

said calculation module comprises at least one functional unit of one of the coders (Gao, column 10, lines 15-23, …*The encoding by the initial frame-processing module 44 quantizes parameters of the speech signal 18 contained in a frame. The quantized parameters result in generation of a portion of the bitstream*… the initial frame-processing module performs the quantization instead of it having to be performed in each of the encoders, therefore the initial frame-processing module

comprises at least one function unit of one of the coders.)

As per claim 12, claim 1 is incorporated and Gao teaches:

wherein said calculation module is independent of said coders and is adapted to redistribute results obtained in step c) to all the coders. (Gao, column 10, lines 15-23, …*The encoding by the initial frame-processing module 44 quantizes parameters of the speech signal 18 contained in a frame. The quantized parameters result in generation of a portion of the bitstream…* The quantization information is passed along to all rate encoders.)

As per claim 27, Gao teaches the method comprising:

feeding an input signal in parallel to an apparatus comprising a plurality of coders, each including a succession of functional units with a view to compression coding of said signal by each coder, where each coder comprises a different combination of functional units (Gao, Fig. 2, columns 9-10, lines 64-67, 1-13, …*it should be noted that the initial frame-processing module 44 performs processing that is common to all the rate encoders 36, 38, 40, and 42 and particular processing that is particular to each rate encoder 36, 38, 40, and 42…*)

a) identifying the functional units forming each coder and one or more functions implemented by each unit (Gao does not explicitly teach the identification of functional units forming each coder. However, Gao, columns 9-10, lines 64-67, 1-13, …*it should be noted that the initial frame-processing module 44 performs processing*

that is common to all the rate encoders 36, 38, 40, and 42 and particular processing that is particular to each rate encoder 36, 38, 40, and 42…, teaches that common processing is performed prior to the rate encoder and therefore the common functions would have inherently had to have been identified.)

b) marking functions that are common from one coder to another;

(Gao does not explicitly teach the marking of common functions, however columns 9-10, lines 64-67, 1-13, teach that common processing is done, therefore it would have been obvious to someone of ordinary skill in the art that the functions common to the coders would have been marked to later be able to compile their functions in the initial frame-processing module.)

c) selecting a function executed by a given coder amongst the functions that are equivalent, and executing said functions with parameters related to the given coder only one time for the input signal for at least some of the coders in a common calculation module (Gao, column 10, lines 15-23, …*The encoding by the initial frame-processing module 44 quantizes parameters of the speech signal 18 contained in a frame. The quantized parameters result in generation of a portion of the bitstream…*, Quantization is typically performed by the encoder, therefore it is selected to be an equivalent functions across all the coders. Furthermore, column 10, lines 5-13, the initial frame-processing module 44 performs a rate identification and thus would know at least a parameter related to the rate coder for identifying which rate encoder to choose.)

d) producing and feeding a coded output signal from the apparatus based at least in part on the common functions. (Gao, Fig. 2, the encoder produces a coded output signal based on the initial frame-processing.)

10. Claims 3-11, 15-16, 21-22, and 24 are rejected under 35 U.S.C. 103(a) as being taught by Gao et al. (US Patent #6581032) in view of Kolesnik et al. (US Patent # 5729655 hereinafter Kolesnik) in further view of Carter et al. (US Patent #5987506 hereinafter Carter)

As per claim 3, claim 2 is incorporated and Gao fails to teach but Kolesnik teaches:

for efficient coding verifying an optimum criterion between complexity and coding quality; (Kolesnik, column 7, lines 49-51, …*To reduce the computational complexity of the search through the SCB, SCB analyzer 209 may be implemented as a trellis codebook*…, Furthermore, Kolesnik, column 5, lines 5-10, …*Compared to the Code Excited Linear Prediction (CELP) analyzer, one embodiment of the present invention reduces the number of bits needed for speech storing, or transmitting, without a significant loss in the subjective speech quality*…, Kolesnik accounts for efficient coding to optimize the complexity and coding quality while reducing bit rate.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the additional advantages of full adaptive codebook searching, shortened adaptive codebook searching, pulse shaping, and low-complexity predictive coding for LPC's.

The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

Gao and Kolesnik fail to teach, but Carter teaches,

for each function executed in step c), at least one functional unit is used of a coder selected from said plurality of coders and the functional unit of said coder selected is adapted to deliver partial results to the other coders; (Carter, column 18, lines 48-57, …*As further depicted in by FIG. 5, each node 212a-212c connects via the shared memory subsystem 220 to a virtual shared memory 222. As will be explained in greater detail hereinafter, by providing the shared memory subsystem 220 that allows the node 212a-212c to access the virtual shared memory 222, the computer network 210 enables network nodes 212a-212c to communicate and share functionality using the same techniques employed by applications when communicating between applications running on the same machine*… The information is stored in shared memory and is available to all processes needing to access it. Thus, Carter provides the sharing of results between the coders of Kolesnik.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Carter with the Gao and Kolesnik device because "A further object of the invention is to provide computer network systems that have adaptable system configurations for dynamically exploiting distributed network resources and

thereby increasing network performance and productivity (Carter, column 2, lines 58-62). Carter provides a system that improves performance by reducing redundancy where Gao also uses common processing where it would have been obvious to likewise reduce redundancy to reduce the required memory for the overall encoder by not performing the same calculations more than necessary.

As per claims 4 and 5, claim 3 is incorporated and Gao fails to teach but Kolesnik teaches:

the selected coder is the coder with the lowest (highest) bit rate and the results obtained after execution of the function in step c) with parameters specific to the selected coder are adapted to the bit rates of at least some of the other coders by a focused parameter search for at least some of the other modes up to the coder with the highest (lowest) bit rate; (Kolesnik, column 8, lines 18-25, …*Since different excitation search modes require differing numbers of bits for excitation coding, the bit rate value is variable from frame to frame. The largest number of bits is required by SACBS mode while the smallest ACB mode is required. To reduce, or to limit, the bit rate, without a substantial loss in speech quality, some restrictions on the search mode usage may be imposed optionally…* Then, Kolesnik, column 8, lines 45-62, describes search mode selection involving …*weighting coefficients effect the probability that a certain mode will be chosen for a given subframe. Through empirical study, the weighting coefficient of Table 2 have been found to provide subjectively good quality speech with a minimum average data rate…*, Kolesnik provides bit rate adjustment

using the weighting coefficients which, in effect, provides an equivalent step in varying the bit rate based upon the searching mode that is chosen for the coder. It would have been obvious given the information in claim 3 that the weighting coefficients would be shared across chosen coders such that coders of different bit rates would be accounted for whether the initial rate was highest or lowest.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the additional advantages of full adaptive codebook searching, shortened adaptive codebook searching, pulse shaping, and low-complexity predictive coding for LPC's. The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

As per claim 6, claim 4, is incorporated and Gao fails to teach but Kolesnik teaches:

the functional unit of a coder operating at a given bit rate is used as the calculation module for that bit rate and at least some of the parameters specific to that coder are progressively adapted: up to the coder with the highest bit rate by focused searching; and up to the coder with the lowest bit rate by focused searching. (Kolesnik, column 8, lines 18-25, …*Since different excitation search modes require differing numbers of bits for excitation coding, the bit rate value is variable from frame to frame. The largest number of bits is required by SACBS mode while the smallest ACB*

mode is required. To reduce, or to limit, the bit rate, without a substantial loss in speech quality, some restrictions on the search mode usage may be imposed optionally…, Then, Kolesnik, column 8, lines 45-62, describes search mode selection involving …*weighting coefficients effect the probability that a certain mode will be chosen for a given subframe. Through empirical study, the weighting coefficient of Table 2 have been found to provide subjectively good quality speech with a minimum average data rate*…, Kolesnik provides bit rate adjustment using the weighting coefficients which, in effect, provides an equivalent step in varying the bit rate based upon the searching mode that is chosen for the coder. It would have been obvious given the information in claim 3 that the weighting coefficients would be shared across chosen coders such that coders of different bit rates would be accounted for whether the initial rate was highest or lowest.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the additional advantages of full adaptive codebook searching, shortened adaptive codebook searching, pulse shaping, and low-complexity predictive coding for LPC's. The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

As per claim 7, claim 1 is incorporated and Gao fails to teach but Kolesnik teaches:

the functional units of the various coders are arranged in a trellis with a plurality of possible paths in the trellis, wherein each path in the trellis is defined by a combination of operating modes of the functional units and each functional unit feeds a plurality of possible variants of the next functional unit; (Kolesnik, column 14, lines 18-24, …*The block diagram in FIG. 5 shows an implementation of a multi-mode trellis encoding and linear prediction (MM-CELP) speech synthesizer. The synthesizer accepts compressed speech data as input and produces a synthesized speech signal. The structure of the synthesizer corresponds to that of the analyzer of FIG. 2, except that trellis encoding has been used*… Kolesnik discloses the use of a trellis coding structure in which the analyzer of Fig. 2 also uses the trellis structure. The analyzer of Fig. 2 provides variable rate LSP encoder 202 (Fig. 4). Kolesnik thus teaches the use of a trellis structure for the coders where the trellis provides an interconnected structure connecting the various function units.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the additional advantages of full adaptive codebook searching, shortened adaptive codebook searching, pulse shaping, and low-complexity predictive coding for LPC's. The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

As per claim 8, claim 7 is incorporated and Gao fails to teach but Kolesnik teaches:

a partial selection module is provided after each coding step conducted by one or more functional units capable of selecting the results supplied by one or more of those functional units for subsequent coding steps; (Kolesnik, column 12, lines 25-28, …*FIG. 4 shows an implementation of the variable rate LSP encoder 202. The LSP encoder 202 uses m quantized LSPs and comprises three schemes for LSP predicting and preliminary coding…*, As shown in Fig. 4, there is a codeword selector (412) that teaches a partial selection module because it selects the results supplied by the function units of the variable rate encoders prior to the encoding (213) as shown in Fig. 2A where Fig. 2A highlights the variable rate LSP encoder (202) in general.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the additional advantages of full adaptive codebook searching, shortened adaptive codebook searching, pulse shaping, and low-complexity predictive coding for LPC's. The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

As per claims 9 and 10, claim 7 is incorporated and Gao fails to teach but Kolesnik teaches:

for a given functional unit, the path selected in the trellis is that passing through

the lowest bit rate functional unit and the results obtained from said lowest (highest) bit rate functional unit are adapted to the bit rates of at least some of the other functional units by a focused parameter search for at least some of the other functional units up to the highest (lowest) bit rate functional unit. (Kolesnik, column 14, lines 18-24, as shown in claim 7 describes how a trellis structure is applied to Kolesnik in accordance with the instant application. Furthermore, it has been shown in claim 5 (Kolesnik, column 8, lines 18-25) and (Kolesnik, column 8, lines 45-62) that Kolesnik provides bit rate adjustment using the weighting coefficients which, in effect, provides an equivalent step in varying the bit rate based upon the searching mode that is chosen for the coder. It would have been obvious given the information in claim 3 that the weighting coefficients would be shared across chosen coders such that coders of different bit rates would be accounted for whether the initial rate was highest or lowest.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the additional advantages of full adaptive codebook searching, shortened adaptive codebook searching, pulse shaping, and low-complexity predictive coding for LPC’s. The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

As per claim 11, claim 9 is incorporated and Gao fails to teach but Kolesnik teaches:

the functional unit operating at said given bit rate is used as the calculation module and at least some of the parameters specific to that functional unit are progressively adapted: up to the functional unit capable of operating at the lowest bit rate by focused searching; and up to the functional unit capable of operating at the highest bit rate by focused searching. (Kolesnik, column 8, lines 18-25, …*Since different excitation search modes require differing numbers of bits for excitation coding, the bit rate value is variable from frame to frame. The largest number of bits is required by SACBS mode while the smallest ACB mode is required. To reduce, or to limit, the bit rate, without a substantial loss in speech quality, some restrictions on the search mode usage may be imposed optionally*… Then, Kolesnik, column 8, lines 45-62 describes search mode selection involving …*weighting coefficients effect the probability that a certain mode will be chosen for a given subframe. Through empirical study, the weighting coefficient of Table 2 have been found to provide subjectively good quality speech with a minimum average data rate*… Kolesnik provides bit rate adjustment using the weighting coefficients which, in effect, provides an equivalent step in varying the bit rate based upon the searching mode that is chosen for the coder. It would have been obvious given the information in claim 3 that the weighting coefficients would be shared across chosen coders such that coders of different bit rates would be accounted for whether the initial rate was highest or lowest.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the additional advantages of full adaptive codebook searching, shortened adaptive

codebook searching, pulse shaping, and low-complexity predictive coding for LPC's. The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

As per claim 15, claim 1 is incorporated and Gao fails to teach but Kolesnik teaches:

the coders in parallel are adapted to operate multimode coding and an a posteriori selection module is provided capable of selecting one of the coders. (Kolesnik, Fig. 2A , shows a parallel multi-mode coding scheme and the comparator and controller (210) is shown to select the mode.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the additional advantages of full adaptive codebook searching, shortened adaptive codebook searching, pulse shaping, and low-complexity predictive coding for LPC's. The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

As per claim 16, claim 15 is incorporated and Gao fails to teach but Kolesnik teaches:

a partial selection module is provided that is independent of the coders and able to select one or more coders after each coding step conducted by one or more functional units. (Kolesnik, column 5, lines 23-24, …*In one embodiment, a set of admissible modes is determined based upon the mode used in the previous subframe*… The comparator and controller (210) is independent of the coders and able to select the mode of the coders after the coding step of the previous frame is complete which teaches the after each coding step conducted by one or more functional units in the instant application.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the additional advantages of full adaptive codebook searching, shortened adaptive codebook searching, pulse shaping, and low-complexity predictive coding for LPC's. The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

As per claim 21, claim 1 is incorporated and Gao fails to teach but Kolesnik teaches:

the coders are of the analysis by synthesis type and the method includes steps common to all the coders including: preprocessing; (Kolesnik, column 5, lines 53-57, …*The digital speech signal, which is typically sampled at 8 KHz, is first processed by a digital pre-filter 200. The purpose of such pre-filtering, coupled with the*

corresponding post-filtering, is to diminish specific synthetic speech noise… The preprocessing of filtering the synthetic speech noise is common to all the coders.)

linear prediction coefficient analysis; (Kolesnik, column 5, lines 10-13, …*Compared to the Code Excited Linear Prediction (CELP) analyzer, one embodiment of the present invention reduces the number of bits needed for speech storing, or transmitting, without a significant loss in the subjective speech quality. These advantages are achieved by: using three different excitation search modes, instead of two modes employed in CELP, together with a special strategy of mode selection, and by using an efficient LPC coding…* The LPC coding would inherently include LPC analysis.)

weighted input signal calculation; and (Kolesnik, column 6, lines 41-43, …*As in CELP, perceptual weighting is realized by passing the prefiltered speech signals through the weighting filter (WF)…* The input signals are weighted in a filter to reduce speech noise lying in audible regions.)

quantization for at least some of the parameters. (Kolesnik, column 5, lines 60-64, …*Pre-filtered speech is analyzed by short-term prediction analyzer 201. Short-term prediction analyzer 201 includes a linear prediction analyzer, a converter from linear prediction coefficients (LPC) into line spectrum pairs (LSPs) and a quantizer of the LSPs…* The line spectrum pairs are parameters and are quantized.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the additional advantages of full adaptive codebook searching, shortened adaptive

codebook searching, pulse shaping, and low-complexity predictive coding for LPC's. The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

As per claim 22, claim 21 is incorporated and Gao fails to teach but Kolesnik teaches:

the partial selection module is used after a split vector quantization step for short-term parameters (Kolesnik, column 5, lines 60-67, …*Pre-filtered speech is analyzed by short-term prediction analyzer 201. Short-term prediction analyzer 201 includes a linear prediction analyzer, a converter from linear prediction coefficients (LPC) into line spectrum pairs (LSPs) and a quantizer of the LSPs*… Kolesnik analyzes short-term parameters prior to the partial selection module as defined above. It would have been obvious to someone of ordinary skill in the art that split vector quantization could be used to analyze the short-term parameters because it is well known in the art. This can be seen in, Kolesnik, column 3, lines 12-16, which discloses "The most effective approaches of this type are split-vector quantization, disclosed in "Efficient Vector Quantization of LPC Parameters at 24 bits/frame," K. K. Paliwal and B. S. Atal, Proceedings of the 1991 IEEE International Conference on Acoustics, Speech and Signal Processing, pp. 661-664, May 1991…")

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the

additional advantages of full adaptive codebook searching, shortened adaptive codebook searching, pulse shaping, and low-complexity predictive coding for LPC's. The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

Claim 24 is rejected under the same principles as claim 1 because claim 1 provides the method for which the software product operates. Additionally, (Kolesnik, claim 24) cites "a method of encoding digitized voice signals in a computer system...." It would have been obvious that a method implemented within a computer system would be executable code embodied in a computer program product stored on a memory.

11. Claims 14, 23, 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gao et al. (US Patent #6581032) in view of Jabri et al. (US Patent #6829579 hereinafter Jabri).

As per claim 14, claim 12 is incorporated and Gao teaches:

the independent module includes a functional unit for performing operations of a coding process; (Gao, column 10, lines 15-23, …*The encoding by the initial frame-processing module 44 quantizes parameters of the speech signal 18 contained in*

a frame…, there is a coding process performed by the initial frame-processing module 44.)

Gao fails to teach but Jabri teaches,

an adaptation transcoding functional unit. (Jabri, abstract, …*A method for transcoding a CELP based compressed voice bitstream from source codec to destination codec. The method includes processing a source codec input CELP bitstream to unpack at least one or more CELP parameters from the input CELP bitstream and interpolating one or more of the plurality of unpacked CELP parameters from a source codec format to a destination codec format if a difference of one or more of a plurality of destination codec parameters including a frame size, a subframe size, and/or sampling rate of the destination codec format and one or more of a plurality of source codec parameters including a frame size, a subframe size, or sampling rate of the source codec format exist*…, Jabri provides a transcoding method between code excited linear prediction (CELP) based compression schemes. It is well known in the art that multi-mode coders can use different coders for different output means.)

Jabri and Gao are analogous art because both deal with coding and compression of audio signals. It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Jabri with the Gao device because “More particularly, the invention provides a method and apparatus for converting CELP frames from one CELP based standard to another CELP based standard, and/or within a single standard but a different mode.” (Jabri, column 2, lines 8-12) Since, multi-mode coders

are known to use multiple coders for optimization, It would have been obvious to someone of ordinary skill in the art that they would need to be transcoded to a uniform state to which they could be compared for the purposes of choosing the superior coding method for the given input signal.

As per claim 23, claim 21 is incorporate and Gao fails to teach, but Jabri teaches:

the partial selection module is used after a shared open loop long-term parameter search step. (Jabri, column 13, lines 50-58, …*An open-loop pitch lag is estimated in every other subframe (except for the 5.15 and 4.75 kbit/s modes for which it is done once per frame) based on the perceptually weighted speech signal*… It would have been obvious that if the open-loop long term parameters are based on the perceptually weighted speech signal, that they would be performed prior to the partial selection module in Kolesnik because the weighting is done directly after pre-filtering.) Jabri and Kolesnik are analogous art because both deal with coding and compression of audio signals.)

Jabri and Gao are analogous art because both deal with coding and compression of audio signals. It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Jabri with the Gao device because “More particularly, the invention provides a method and apparatus for converting CELP frames from one CELP based standard to another CELP based standard, and/or within a single standard but a different mode.” (Jabri, column 2, lines 8-12) Since, multi-mode coders are known to use multiple coders for optimization, It would have been obvious to

someone of ordinary skill in the art that they would need to be transcoded to a uniform state to which they could be compared for the purposes of choosing the superior coding method for the given input signal.

As per claim 25, Gao teaches the system comprising:

an apparatus comprising a plurality of coders that are fed in parallel an input signal each coder including a succession of functional units for the purposes of compression coding of said signal by each coder. (Gao, Fig. 2, columns 9-10, lines 64-67, 1-13, …*it should be noted that the initial frame-processing module 44 performs processing that is common to all the rate encoders 36, 38, 40, and 42 and particular processing that is particular to each rate encoder 36, 38, 40, and 42…* Gao, claim 1 teaches a system.)

an input signal feeds in parallel a plurality of coders each including a succession of functional units with a view to compression coding of said signal by each coder, wherein each coder comprises a different combination of functional units, (Gao, Fig. 2, columns 9-10, lines 64-67, 1-13, …*it should be noted that the initial frame-processing module 44 performs processing that is common to all the rate encoders 36, 38, 40, and 42 and particular processing that is particular to each rate encoder 36, 38, 40, and 42…*)

said preparatory steps including: a) identifying the functional units forming each coder and one or more functions implemented by each unit (Gao does not explicitly teach the identification of functional units forming each coder. However, Gao,

columns 9-10, lines 64-67, 1-13, …*it should be noted that the initial frame-processing module 44 performs processing that is common to all the rate encoders 36, 38, 40, and 42 and particular processing that is particular to each rate encoder 36, 38, 40, and 42*…, teaches that common processing is performed prior to the rate encoder and therefore the common functions would have inherently had to have been identified.)

b) marking functions that are common from one coder to another;

(Gao does not explicitly teach the marking of common functions, however columns 9-10, lines 64-67, 1-13, teach that common processing is done, therefore it would have been obvious to someone of ordinary skill in the art that the functions common to the coders would have been marked to later be able to compile their functions in the initial frame-processing module.)

c) executing said common functions only one time for the input signal for at least some of the coders in a common calculation module (Gao, column 10, lines 15-23, …*The encoding by the initial frame-processing module 44 quantizes parameters of the speech signal 18 contained in a frame. The quantized parameters result in generation of a portion of the bitstream*…, The quantization occurs once per frame for the input signal.)

d) producing and feeding a coded output signal from the apparatus based at least in part on the common functions. (Gao, Fig. 2, the encoder produces a coded output signal based on the initial frame-processing.)

Gao fails to teach, but Jabri teaches:

a memory adapted to store instructions of a software product for implementing preparatory steps of a transcoding method (Jabri, abstract, …*A method for transcoding a CELP based compressed voice bitstream from source codec to destination codec…*, Jabri provides a transcoding method between code excited linear prediction (CELP) based compression schemes where Gao provides the preparatory steps.)

Jabri and Gao are analogous art because both deal with coding and compression of audio signals. It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Jabri with the Gao device because "More particularly, the invention provides a method and apparatus for converting CELP frames from one CELP based standard to another CELP based standard, and/or within a single standard but a different mode." (Jabri, column 2, lines 8-12) Since, multi-mode coders are known to use multiple coders for optimization, It would have been obvious to someone of ordinary skill in the art that they would need to be transcoded to a uniform state to which they could be compared for the purposes of choosing the superior coding method for the given input signal.

Claim 26 is rejected under the same principles as claim 12 because claim 12 provides the method for which the device in claim 26 operates.

12. Claims 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gao et al. (US Patent #6581032) in view of Jabri et al. (US Patent #6829579 hereinafter

Jabri). and further in view of Aguilar et al. (US Patent #7272556 hereinafter Aguilar).

As per claim 17, claim 1 is incorporated and Gao fails to teach:

the calculation module includes a bit assignment functional unit shared between all the coders, each bit assignment effected for one coder being followed by an adaptation to that coder, in particular as a function of its bit rate.

(Jabri, column 10, lines 21-22, …*Subframe interpolation may be needed when subframes for different standards represent different time durations in the signal domain, or when a different sampling rate is used*... It would have been obvious to someone of ordinary skill in the art that if different bit rates are used for the coders, there would need to be an indication of the bit rate of the coder that would be common to all coders such that transcoding is possible.)

Jabri and Gao are analogous art because both deal with coding and compression of audio signals. It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Jabri with the Gao device because “More particularly, the invention provides a method and apparatus for converting CELP frames from one CELP based standard to another CELP based standard, and/or within a single standard but a different mode.” (Jabri, column 2, lines 8-12) Since, multi-mode coders are known to use multiple coders for optimization, It would have been obvious to someone of ordinary skill in the art that they would need to be transcoded to a uniform state to which they could be compared for the purposes of choosing the superior coding method for the given input signal.

Neither Gao nor Jabri teaches, but Aguilar teaches:

the coders are of the transform type. (Aguilar, column 4, lines 1-3, …*Yet another object of the present invention is to provide a transform codec with multiple stages of increasing complexity and bit-rates*… Aguilar provides a transform coder in a multimode system.)

Aguilar, Jabri and Gao are analogous art because both pertain to compression coding for audio signals. It would have been obvious to someone of ordinary skill in the art to combine Aguilar with the Gao and Jabri device because Aguilar is an analogous invention which uses transform coders instead of CELP coders. Thus, it would have been obvious to switch the coders for either transform or CELP coders because they are functionally equivalent elements.

As per claim 18, claim 17 is incorporated and Gao teaches:

the method further includes a quantization step the results whereof are supplied to all the coders (Gao, column 10, lines 14-20)

As per claim 19, claim 18 is incorporated and Gao and Jabri fails to teach, but Aguilar teaches:

it further includes steps common to all the coders including: a time-frequency transform; (Aguilar, column 8, lines 8-13, …*in accordance with the present invention, the band splitter 5 can be implemented as a filter bank, an FFT transform or wavelet transform computing device, or any other device that can split a signal into*

several signals representing different frequency bands… An FFT transform is a time-frequency transform.)

detection of voicing in the input signal; (Aguilar, column 10, lines 57-65, ...*In speech applications it is usually necessary to provide a measure of how voiced (i.e., how harmonic) the signal is at a given time, and a measure of its volume or its gain. In very low bit-rate applications in accordance with the present invention one can therefore only transmit a harmonic frequency, a voicing probability indicating the extent to which the spectrum is dominated by voice harmonics, a gain, and a set of parameters which correspond to the spectrum envelope of the signal…* Aguilar provides a measure of how voiced the signal at a given time is, which inherently means it would be detected.)

detection of tonality; (Aguilar, column 13, lines 60-64, ...*The refined pitch estimate obtained in block 70 and the SEEVOC flat-top spectrum envelope are used to create in block 80 of the analyzer a smooth estimate of the spectral envelope using in a preferred embodiment cubic spline interpolation between peaks…* The pitch estimate would inherently be a detection of tonality because by estimating the pitch would determine a pitch amplitude which would be indicative of the tonality of the speech or audio input.)

determination of a masking curve; (Aguilar, column 19, lines 35-37, ...*In a preferred embodiment of the present invention, the masking envelope is computed as an attenuated LPC spectrum of the signal in the frame. This selection gives good results, since the LPC envelope is known to provide a good model of the*

peaks of the spectrum if the order of the modeling LPC filter is sufficiently high…The masking envelope teaches a masking curve for eliminating low side effects.)

spectral envelope coding; (Aguilar, column 10, lines 48-51, ...*The next block in FIG. 3A shows that instead of transmitting the magnitudes of each sinusoid, one can only transmit information about the spectrum envelope of the signal*… By transmitting the spectral envelope, it would inherently be coded.)

Aguilar, Jabri and Gao are analogous art because both pertain to compression coding for audio signals. It would have been obvious to someone of ordinary skill in the art to combine Aguilar with the Gao and Jabri device because Aguilar is an analogous invention which uses transform coders instead of CELP coders. Thus, it would have been obvious to switch the coders for either transform or CELP coders because they are functionally equivalent elements.

As per claim 20, claim 17 is incorporated and Gao fails to teach, but Aguilar teaches:

application of a bank of analysis filters; (Aguilar, column 8, lines 8-13, ...*in accordance with the present invention, the band splitter 5 can be implemented as a filter bank, an FFT transform or wavelet transform computing device, or any other device that can split a signal into several signals representing different frequency bands…)*

determination of scaling factors; (Aguilar, column 10, lines 54-57, ...*As known in the art, the spectrum envelope can be encoded using different parameters, such as LPC coefficients, reflection coefficients (RC), and others*… The coefficients are

scaling factors.)

spectral transform calculation; (Aguilar, column 17, lines 7-11, ...*In the following block 35, the magnitude and unwrapped phase envelopes are upsampled to 256 points using linear interpolation in a preferred embodiment. Alternatively, this could be done using the Discrete Cosine Transform (DCT) approach described in Section E.1*…)

determination of masking thresholds in accordance with a psycho-acoustic model; (Aguilar, column 19, lines 17-21, ...*Block 240 computes a masking envelope that provides a dynamic thresholding of the signal spectrum to facilitate the peak picking operation in the following block 250, and to eliminate certain low-level peaks, which are not associated with the harmonic structure of the signal*… The harmonic structure teaches the psycho-acoustic model and thus the masking envelope creates thresholds in accordance with a psycho-acoustic model.)

Aguilar, Jabri and Gao are analogous art because both pertain to compression coding for audio signals. It would have been obvious to someone of ordinary skill in the art to combine Aguilar with the Gao and Jabri device because Aguilar is an analogous invention which uses transform coders instead of CELP coders. Thus, it would have been obvious to switch the coders for either transform or CELP coders because they are functionally equivalent elements.

Allowable Subject Matter

13. Claim 13 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As per claim 13, the closest known prior art Gao, Kolesnik, Carter, or Jabri fails to teach alone or in reasonable combination:

the independent module and the functional unit or units of at least one of the coders are adapted to exchange results obtained in step c) with each other and the calculation module is adapted to effect adaptation transcoding between functional units

Gao teaches a unit which processes common functions prior to the individual encoder processes. Kolesnik provides a multimode coding system. Carter provides shared memory spaces for redundancy reduction. Jabri provides a transcoding method between code excited linear prediction (CELP) based compression schemes. However, none of them teach that the coders and the common calculation module are adapted to exchange results.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Refer to PTO-892, Notice of References Cited for a listing of analogous art.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to GREG A. BORSETTI whose telephone number is (571)270-3885. The examiner can normally be reached on Monday - Thursday (8am - 5pm Eastern Time).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, RICHEMOND DORVIL can be reached on 571-272-7602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Greg A. Borsetti/
Examiner, Art Unit 2626

/Talivaldis Ivars Smits/
Primary Examiner, Art Unit 2626

2/25/2009